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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,464	10/22/2003	Nobuaki Kamiyama	9319G-000581	7325

27572 7590 11/19/2007
HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

EXAMINER	
LEBRON, JANNELLE M	
ART UNIT	PAPER NUMBER
2861	
MAIL DATE	DELIVERY MODE
11/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/691,464	KAMIYAMA ET AL.	
	Examiner	Art Unit	
	Jannelle M. Lebron	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6,8-10 and 15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6,8-10 and 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on *22 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takizawa et al. (US Patent 6,357,849) in view of Yoshiyama et al. (US 2002/0140750) and further in view of Culpovich et al. (US Patent 6,551,521).

3. Takizawa discloses a device manufacturing apparatus (20 in figure 14) comprising:

- Claim 1:

a discharge head (36 in figure 14) for discharging a droplet containing a functional material;

a stage (26 in figure 14) for supporting a substrate on which said droplet is discharged, and which is capable of moving relative to said discharge head (sub-scanning direction in figure 14);

a carrier (24 in figure 14) for carrying said substrate;

a detector (40 in figure 14) for detecting a discharge condition of said droplet which is discharged from a discharge nozzle formed in said discharge head;

a driving device (28 in figure 14) for moving said discharge head with respect to said detector (column 10, lines 54-59); and

a controller (54 in figure 16) for executing a detection operation by said detector during loading and unloading operations of said substrate (the paper is fed [loaded and unloaded] between printing swaths (col.7, lines 48-53) and the detection of malfunctioning nozzles takes place between said swaths (col.15, lines 18-38)), wherein

said detector and said stage are provided at different locations (as seen in figures 14 and 15; column 10, lines 66-67);

said detector includes a light emitter (40a in figure 14) for emitting a detection light; and a receiver (40b in figure 14) for receiving said detection light emitted from said light emitter (40a);.

said receiver (40b) determines whether said droplet is being discharged from said discharge nozzle, based on changes in the intensity of said detection light received by said receiver due to said liquid passing through the optical path of said detection light (column 13, lines 32-36).

Thus Takizawa et al. discloses the claimed limitations as set forth above except "said loading and unloading operations being made by replacing a first substrate being the substrate currently supported on the stage with a second substrate being another substrate not supported on the stage" and "said controller performs calibration of said receiver before execution of a nozzle detection operation, said calibration including resetting of gain data at present of said receiver."

Yoshiyama et al. discloses a calibration process in an inkjet printer that conducts ink detection during a paper-discharging period (defined as the interval after printing has been completed and the recording sheet is discharged) so that the detection can be made prior to feeding the next sheet of recording paper. Also, Yoshiyama et al. teaches the calibration process being for an optical sensor where the intensity of the reflected light is controlled to obtain the best detecting position [which has to be done before the detection operation]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. invention to include means for calibrating a light receiver before conducting detection steps during loading and unloading operations as taught by Yoshiyama et al. for the purpose of improving printing speed and detecting a level of reflected light with accuracy.

Furthermore, Culpovich et al. discloses highly accurate light sensors that are calibrated when the light received, or gain, is outside of a predetermined threshold. When the gain is found to be inside the threshold, then the system (and with it the gain data) is reset (col. 10, lines 49-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. invention to include means for calibrating the receiver including resetting the gain data of the receiver as taught by Culpovich et al. for the purpose of obtaining better accuracy when detecting a level of reflected light.

4. Takizawa further discloses a device manufacturing apparatus:

- Claim 4:

further comprising:

a recovery unit for performing a recovery operation of said discharge nozzle (column 9, lines 10-15).

- Claim 9:

wherein said device is at least one of; a liquid crystal element, an organic electroluminescent element, a plasma display element, an electron emission element, an optical element and a conductive film element (the device produced by Takizawa et al. is so-called "optical element").

5. Takizawa discloses a device manufacturing method comprising:

- Claim 10:

a step of discharging a droplet containing a functional material onto a substrate by means of a discharge nozzle (Abstract) in a discharge head (36 in figure 14; column 10, lines 51-53);

a carrying step of loading and unloading said substrate (column 10, lines 54-57);

a step of moving said discharge nozzle from a first position at which said step of discharging said droplet is carried out, to a second position at which an operation for detecting a discharge condition of said droplet which is discharged from said discharge nozzle is carried out, during said carrying step (from the "printing area" to the "adjustment area" in figure 15); and

a detection step of detecting said discharge condition during said carrying step (column 13, lines 25-36), wherein

said detection step of detecting said discharge condition includes the steps of emitting detection light towards a receiver; and determining whether said droplet is being discharged from said discharge nozzle, based on changes in the intensity of said detection light received by said receiver due to said droplet passing through the optical path of said detection light (col. 13, lines 25-36).

Thus Takizawa et al. discloses the claimed limitations as set forth above except "in which a first substrate being the substrate currently positioned at the first position is replaced with a second substrate being another substrate currently not positioned on the first position" and "wherein calibration of the receiver is performed before execution of a nozzle detection operation, said calibration including resetting of a gain data at present of said receiver."

Yoshiyama et al. discloses a calibration process in an inkjet printer that conducts ink detection during a paper-discharging period (defined as the interval after printing has been completed and the recording sheet is discharged) so that the detection can be made prior to feeding the next sheet of recording paper. Also, Yoshiyama et al. teaches the calibration process being for an optical sensor where the intensity of the reflected light is controlled to obtain the best detecting position [which has to be done before the detection operation]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. invention to include means for calibrating a light receiver before conducting detection steps during loading and unloading operations as taught by Yoshiyama et al. for the purpose of improving printing speed and detecting a level of reflected light with accuracy.

Furthermore, Culpovich et al. discloses highly accurate light sensors that are calibrated when the light received, or gain, is outside of a predetermined threshold. When the gain is found to be inside the threshold, then the system (and with it the gain data) is reset (col. 10, lines 49-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. invention to include means for calibrating the receiver including resetting the gain data of the receiver as taught by Culpovich et al. for the purpose of obtaining better accuracy when detecting a level of reflected light.

6. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takizawa et al. (US Patent 6,357,849) in view of Yoshiyama et al. (US 2002/0140750) and Culpovich et al. (US Patent 6,551,521) and further in view of Bruch et al. (US Patent 6,814,422).

- Claim 5:

Takizawa et al. in view of Yoshiyama et al. and Culpovich et al. discloses the claimed limitations as set forth above except "wherein said controller performs said recovery operation corresponding to detection results of said detector, and reexecutes detection a predetermined number of times."

Bruch et al. discloses a method of servicing a printhead, comprising a drop detection step and a nozzle recovery step controlled by a controller wherein the "step of performing automatic printhead intervention is initiated if, during a last fixed number of drop detections, the number of bad nozzles was greater than the threshold level.

Preferably the fixed number of previous drop detections may be 8, 16, or 64 (column 15, lines 19-23)."

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a drop detector that reexecutes detection a predetermined number of times. One would have been motivated to modify Takizawa et al. in view of Yoshiyama et al. to improve print quality as taught by Bruch et al.

- Claim 8:

Takizawa et al. in view of Yoshiyama et al. and Culpovich et al. discloses the claimed limitations as set forth above except "wherein said discharge head is two or more". Takizawa et al. teaches a printhead (36 in figure 17) with a row of nozzles each different color (as seen in figure 17).

Bruch et al. discloses a carriage (40 in figure 2) positioned with the pens (50, 52, 54, 56 in figure 2) ready to be serviced by a replaceable printhead cleaner service station system (70 in figure 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a carriage positioned with two or more printheads. One would have been motivated to modify Takizawa et al. in view of Yoshiyama et al. to make printhead replacement easier as taught by Bruch et al.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takizawa et al. (US Patent 6,357,849) in view of Yoshiyama et al. (US 2002/0140750) and Culpovich et al. (US Patent 6,551,521) and further in view of Hah (US Patent 6,371,590).

Takizawa et al. discloses the claimed limitations as set forth above except "further comprising a display device for displaying detection results of said detector, and an error based on the detection results."

Hah teaches a display device that displays "an error message when at least one nozzle is malfunctioning, the quantity of malfunctioning nozzles in the printhead, the quantity of functioning nozzles in the printhead and which individual nozzles are malfunctioning, if any (column 5, lines 5-14)."

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a printing system with droplet detection means and a display device for displaying detection results. One would have been motivated to modify Takizawa in view of Yoshiyama et al. in order to discover the presence of malfunctioning nozzles as taught by Hah.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takizawa et al. (US Patent 6,357,849) in view of Yoshiyama et al. (US 2002/0140750) and further in view of Cleary et al. (US 2002/0149660).

Takizawa et al discloses a device manufacturing method comprising:

loading a first substrate (paper P in fig.14) onto a stage (26 in fig. 14; in the sub-scanning direction as seen in fig.14);

discharging droplets onto the first substrate from a nozzle (Abstract) in a discharge head (36 in fig. 14; col.10, lines 51-53);

unloading said first substrate from the stage (as seen in fig.14); and

during the loading or unloading, testing the discharge head by passing droplets therefrom through a light beam (by light emitter 40a in figure 14; the paper is fed [loaded and unloaded] between printing swaths (col.7, lines 48-53) and the detection of malfunctioning nozzles takes place between said swaths (col.15, lines 18-38)), wherein

said testing of the discharge head includes the steps of:

emitting detection light towards a receiver; and

determining whether said droplet is being discharged from said nozzle, based on changes in the intensity of said detection light beam received by said receiver due to said droplets passing through the optical path of said light beam (col. 13, lines 25-36).

Thus, Takizawa et al. teach all the claim limitations as set forth above except "during the loading of a second substrate not positioned on the stage, onto the stage or unloading of the first substrate positioned on the stage" and "wherein calibration of said receiver is performed before execution of a nozzle detection operation, said calibration including resetting of a gain data at present of said receiver."

Yoshiyama et al. discloses a calibration process in an inkjet printer that conducts ink detection during a paper-discharging period (defined as the interval after printing has been completed and the recording sheet is discharged) so that the detection can be made prior to feeding the next sheet of recording paper. Also, Yoshiyama et al. teaches the calibration process being for an optical sensor where the intensity of the reflected light is controlled to obtain the best detecting position [which has to be done before the detection operation]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. invention to include

means for calibrating a light receiver before conducting detection steps during loading and unloading operations as taught by Yoshiyama et al. for the purpose of improving printing speed and detecting a level of reflected light with accuracy.

Furthermore, Culpovich et al. discloses highly accurate light sensors that are calibrated when the light received, or gain, is outside of a predetermined threshold. When the gain is found to be inside the threshold, then the system (and with it the gain data) is reset (col. 10, lines 49-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. invention to include means for calibrating the receiver including resetting the gain data of the receiver as taught by Culpovich et al. for the purpose of obtaining better accuracy when detecting a level of reflected light.

Furthermore, Takizawa et al. fails to disclose "treating the droplets to form a structure on the substrate".

Cleary et al. disclose "an apparatus for setting radiation curable ink deposited onto a substrate. The apparatus includes a series of ink jet printheads, which deposit ink onto the substrate, and a radiation source mounted laterally to the series of ink jet print heads (Abstract)." The substrate (32 in fig. 11) is fed through the printing system (in the direction of arrow A in fig. 11), receives ink from the printheads and is moved to the curing station (200 in fig.11; page4, paragraph 0045).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide means for treating the droplets after being deposited on the substrate to form a structure. One would have been motivated to modify Takizawa et al.

in view of Yoshiyama et al. in order to dry and cure the ink and obtain better print quality as taught by Cleary et al.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 4-6, 8-10 and 15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication with the USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jannelle M. Lebron whose telephone number is (571) 272-2729. The examiner can normally be reached on Monday thru Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jannelle M. Lebrón
AU 2861
11/09/2007

MATTHEW LUU
SUPERVISORY PATENT EXAMINER